

LIST OF DIATOMACEÆ FROM A DEEP-SEA DREDGING IN THE
ATLANTIC OCEAN OFF DELAWARE BAY BY THE U. S. FISH
COMMISSION STEAMER ALBATROSS.

BY

ALBERT MANN.

In presenting this list of species of the Diatomaceæ, accompanied with mounted specimens, which I have discovered in the first of the deep-sea Atlantic dredgings submitted to me for examination, I wish to offer some general results of the investigation.

This dredging was taken by the United States steamer *Albatross* at Station No. 2721, being in latitude $38^{\circ} 56' 00''$ N. and longitude $72^{\circ} 11' 30''$ W., and in 813 fathoms of water. The species found (numbering 145, and with varieties 156) comprise not only marine forms, but a large number that are known to be fresh-water, and some found hitherto only in a fossil state.

Before treating the material with acids I carefully examined it as it was sent to me, preserved in alcohol, and discovered that none of the frustules contain a particle of endochrome or organic matter. This, taken in connection with the depth of water, the large number of species represented, and the before-mentioned fact that there are many fresh-water and fossil as well as marine forms, makes it evident that the entire deposit is composed of fine detritus gradually sifted down upon the sea bottom and conveyed there by currents from a considerable distance.

The Delaware River has without doubt supplied most of the material of this dredging, as it empties into the ocean almost directly west of the locality where it was taken, and as most of the forms (marine and fresh) are such as are common in rivers and streams of correspondingly temperate latitude.

An interesting corroboration of this is to be found in one of the fossil species, *Navicula Schultzzi* Kain. This diatom was originally discovered in material from an artesian well at Atlantic City, N. J., at a depth of 406 feet, by Mr. C. H. Kain, of Philadelphia, Pa., and named by him. The same stratum however, outcrops at several places along the Delaware River watershed, notably at Shiloh, N. J., and this diatom, with, perhaps, *Raphoneis gemmifera* Ehrb., and other of the fossil forms, could have gotten into this dredging in no other way than by being brought by the Delaware River from some of these outcrops. But there are some forms occurring abundantly in this deposit which are essentially tropical; these

may have been conveyed here by the Gulf Stream, which flows northward near this point.

By laborious examination of nearly all the literature on the Diatomaceæ I found it unnecessary to give a new name to a single one of the many species discovered. This is really a cause for congratulation, for, however enticing to the investigator the opportunity of naming "new forms" may be, it is a thing to be avoided whenever possible. All departments of natural science are afflicted with a host of unwarranted names, and none more so than that of the Diatomaceæ, where at least 20 per cent of the generic and specific names are fictitious. For this reason I have been compelled to make, in the pages following, a number of corrections of familiar names.

The entire absence of new species in this gathering is an additional confirmation of the statement that it is entirely the product of transportation; since diatoms found growing at so unusual a depth would have quite certainly supplied some hitherto unknown forms.

Following is a list of genera and species found, together with references to the drawing and descriptions in published works by which they were identified.

Actinocyclus crassus W. S. (Van Heurck's Synopsis, pl. 124, fig. 8. Smith's B. D., pl. 4, fig. 41.) Very scarce.

Actinocyclus Ralfsii W. S. (Van Heurck's Synop., pl. 123, fig. 6.) Common.

The forms here found are somewhat intermediate between the above and *A. Ehrenbergii* Ralfs. In fact, these two species are known to grade into each other by almost indistinguishable forms; so that it is probable they should constitute only varieties of one species.

Actinocyclus Ralfsii, var. *sparsus* (= *Eupodiscus sparsus*, Greg.). (Pritchard's Infusoria, p. 835; Moebius's Plates, pl. 12, fig. 174.) Frequent.

Actinocyclus subtilis Ralfs. (Van Heurck's Syn., pl. 124, fig. 7, pl. 125, figs. 9 and 11.) Scarce.

Actinoptocyclus hexagonus Grun. (Schmidt's Atlas, pl. 1, fig. 15.) Very scarce.

Actinoptocyclus splendens Ralfs. (Van Heurck's Syn., pl. 119, figs. 1-4, pl. 120, figs. 1-6.) Frequent.

Actinoptocyclus undulatus Ehrb. (Schmidt's Atlas, pl. 1, figs. 1-6.) Common.

Amphiprora ornata Bail. (Van Heurck's Syn., pl. 22 bis, fig. 5.) Very scarce.

Amphora bigibba Grun. (Schmidt's Atlas, pl. 25, figs. 69-70.) Scarce.

Amphora cingulata Cleve. (Schmidt's Atlas, pl. 26, fig. 17.) Very scarce.

Amphora cymbifera Greg. (Schmidt's Atlas, pl. 25, figs. 47-48.) Scarce.

Amphora obtusa Greg. (Schmidt's Atlas, pl. 40, fig. 16.) Scarce.

Amphora porcellus Kiffon (= *A. novæ-calidoniæ* Grun.). (Schmidt's Atlas, pl. 39, fig. 15.) Scarce.

Amphora proteus Greg. (Schmidt's Atlas, pl. 27, fig. 3, pl. 28, fig. 9.) Frequent.

Amphora sulcata Bréb. (Pritchard's Infusoria, p. 883; "The Lens," pl. 2, fig. 11, and pp. 75-76.) Very scarce.

Asterionella formosa Hassal. (Van Heurck's Syn., pl. 51, fig. 22.) Common.

Asterolampra Marylandica Ehrb. (Moebius's Plates, pl. 32, figs. 1-4.) Scarce.

Asteromphalus Brookei Bail. var. (Schmidt's Atlas, pl. 38, fig. 9.) Frequent.

Although Prof. H. L. Smith's suggestion, to unite the genus *Asteromphalus* with the former genus, is along the line of much needed abridgment; it yet seems that, as most of the genera are now constituted,

there is sufficient difference between these two to warrant their remaining separate.

Asteromphalus flabellatus Grev. (Schmidt's Atlas, pl. 38, fig. 10; Moebius's Plates, pl. 21, fig. 5.) Frequent.

Asteromphalus Shadboldtianus Grev. (Schmidt's Atlas, pl. 38, fig. 17; Moebius's Plates, pl. 33, fig. 19.) Scarce.

Auliscus cælatus Bail. (Schmidt's Atlas, pl. 32, figs. 14-15.) Very scarce.

The only species found of this prolific genus.

Biddulphia aurita Lyngb. (Schmidt's Atlas, pl. 120, figs. 5-10, pl. 122, figs. 1-8.) Common.

Biddulphia Tuomeyii Breb. (Schmidt's Atlas, pl. 118, figs. 1-7, pl. 119, figs. 1-8.) Common.

Chaetoceros coarctata Land. (Lander's Hong Kong, pl. 8, fig. 8, page 79; Cleve's Java, pl. 2, fig. 10.) Frequent.

Chaetoceros varians Land. (= *Bacteriastrum varians*, etc.). (Moebius's Plates, pl. 56, figs. 1-6.) Frequent.

The genus *Bacteriastrum* is rightly included in *Chaetoceros*; different frustules in the same filament often displaying the characteristics of both.

Cocconeis distans Greg. (Pritchard's Inf., pl. 7, fig. 38, page 870.) Scarce.

Cocconeis placentula Ehrb. (Van Heurck's Syn., pl. 30, figs. 26-27; Moebius's Plates, pl. 4, fig. 1.) Frequent.

Cocconeis scutellum Ehrb. (Pritchard's Inf., page 869; Van Heurck's Syn., pl. 29, figs. 1-2.) Common.

The above figures and description by Mr. Ralfs appear sufficient to separate this from *C. distans*.

Coscinodiscus asteromphalus Ehrb. (Schmidt's Atlas, pl. 63, figs. 1-2; pl. 113, fig. 22; Van Heurck's Syn., pl. 130, figs. 1 and 5; Pritchard's Inf., page 828.) Frequent.

Coscinodiscus confusus Rattray. (Schmidt's Atlas, pl. 63, fig. 15.) Frequent.

Coscinodiscus convexus A. S. (Schmidt's Atlas, pl. 60, figs. 13 and 15.) Scarce.

Coscinodiscus decrescens Grun. (Schmidt's Atlas, pl. 61, figs. 8-10.) Frequent.

Coscinodiscus excentricus Ehrb. (Schmidt's Atlas, pl. 58, fig. 49; Van Heurck's Syn., pl. 130, figs. 4 and 8.) Common.

Coscinodiscus lineatus Ehrb. (Van Heurck's Syn., pl. 131, fig. 3.) Frequent.

Coscinodiscus oblongus Grev. (Schmidt's Atlas, pl. 66, figs. 10-11.) Scarce.

Coscinodiscus radiatus Ehrb. (Schmidt's Atlas, pl. 60, figs. 5, 6, 9, 10.) Very common.

Coscinodiscus robustus Grev. (Schmidt's Atlas, pl. 62, figs. 4-6.) Scarce.

Coscinodiscus symbolophorus Grun. (Schmidt's Atlas, pl. 138, figs. 1-3.) Frequent.

Coscinodiscus symmetricus Grev. (Schmidt's Atlas, pl. 57, fig. 27.) Very common.

Coscinodiscus traduceus, var. *hispida*, Rattray. (Schmidt's Atlas, pl. 57, fig. 38.) Frequent.

Cyclotella physoplea Kg. (Ehrenberg's Mik., Pl. 33, 17, fig. 8; Pritchard's Inf., page 811.) Scarce.

It is very probable that this is only an inner shell of some other species.

Cyclotella striata Grun. (Van Heurck's Syn., pl. 92, figs. 6-10, 12.) Frequent.

Cymatopleura solea W. S. (Van Heurck's Syn., pl. 55, figs. 5-7; Pritchard's Infusoria, pl. 9, fig. 155, page 793.) Very scarce.

The six transverse undulations are absent in this variety. Indeed, they are so frequently absent in specimens of this form, that they

should be dropped as a specific characteristic. The genus ought to be included under *Surirella*.

Cymatosira Laurenziana Grun. (Van Heurck's Syn., pl. 45, fig. 42.) Frequent.

This genus should be, as suggested by Prof. H. L. Smith, united under *Fragilaria*, from which it differs in no important respect. Lyngbye constituted the genus *Fragilaria* in 1819; Grunow that of *Cymatosira* in 1862.

Cymbella cistula Hempr. (Van Heurck's Syn., pl. 2, figs. 12, 13.) Scarce.

Cymbella cuspidata Kg. (Van Heurck's Syn., pl. 2, fig. 3.) Scarce.

Cymbella parva W. S. (Van Heurck's Syn., pl. 2, fig. 14. Schmidt's Atlas, pl. 10, fig. 15.) Frequent.

This is, however, hardly W. Smith's *C. parva* ("Cocconema parvum"), as is seen by his figure, pl. 23, fig. 222, and p. 76. It should either receive a new specific name, or be classed as a small form of *C. cymbiformis* E., from which it differs very slightly.

Denticula elegans Kg. (Van Heurck's Syn., pl. 49, figs. 14, 16.) Scarce.

Ditylum (= *Triceratium*) *Brightwellii* West. (Van Heurck's Syn., pl. 114, figs 3-9.) Common.

This diatom is evidently a distinct genus, and should be restored with its old name, as suggested by Prof. H. L. Smith. The unscientific genus "*Triceratium*" is quite overcrowded with dissimilar forms without this.

Encyonema prostratum Ralfs. (Van Heurck's Syn., pl. 3, figs 9-11.) Frequent.

As the growth of diatoms in gelatinous tubes or otherwise is no longer considered ground to constitute a genus, this form should be classed under *Cymbella*, from which it differs in no other respect.

Epithemia turgida Kg. (Van Heurck's Syn., pl. 31, figs 1, 2.) Frequent.

Epithemia Westermanni Kg. (Van Heurck's Syn., pl. 31, fig. 8. Kutzing's Bac., pl. 5, fig. 12.) Frequent.

This is nothing more than a close variety of *E. turgida* Kg., and should not be made a separate species. William Smith's figure of '*E. Westermanni* Kg.' is certainly incorrect. See Smith's B. D., pl. 1, fig 11.

Epithemia zebra Kg. (Van Heurck's Syn., pl. 31, figs. 9-14.) Scarce.

Eunotia pectinalis Rabenh. (Van Heurck's Syn., pl. 33, figs. 15-19.) Frequent.

Euodia (= *Hemidiscus*) *cuneiformis* Wall. (Wall, T. M. S., 1860, pl. 2, figs. 3, 4, p. 42. Pritchard's Inf., pl. 6, fig. 14.) Very common.

This is probably the *E. gibba* of Bailey. Compare with above Pritchard's Inf., pl. 8, fig. 22, p. 852. It is virtually identical with *E. inornata* of Castricane. See *Challenger* Exp., pl. 12, fig. 1, p. 149. The older name *Euodia* (1859) should take the place of *Hemidiscus* (1860).

Eupodiscus radiatus Bail. (Van Heurck's Syn., pl. 118, figs. 1, 2. Moebius's Plates, pl. 28, fig. 10. Smith's B. D., pl. 30, fig. 255.) Scarce.

This diatom is identical with *Coccinodiscus radiatus* E., except for the ocelli of the former; and as frustules that normally have processes are often destitute of the same, these two forms are suspiciously alike.

Eupodiscus tessellatus Roper. (Van Heurck's Syn., pl. 118, figs. 6-7.) Very scarce.

There is not sufficient warrant for *M. Van Heurek* according to this form the generic name "*Roperia*."

Fragilaria capucina Desmaz. (Smith's B. D., pl. 35, fig. 296.) Common.

Fragilaria Schwarzii Grun. (Van Heurek's Syn., pl. 44, fig. 24.) Very scarce.

The difference between this and *F. pacifica* Grun. is too slight to warrant their separation.

Gomphonema sphærophorum Ehrb. (Van Heurek's Syn., pl. 23, fig. 30.) Scarce.

This is the same as *G. lagenula* Kg. See Van Heurek's Syn., pl. 25, figs. 8-9. Ralfs rightly unites the two. Pritchard's Inf., p. 889.

Grammatiphora macilenta W. S. (Smith's B. D., pl. 61, fig. 382, p. 43. Van Heurek's Syn., pl. 53, fig. 16.) Frequent.

Hemiaulus polycistinorum Ehrb. (Schmidt's Atlas, pl. 143, figs. 23-29.) Frequent.

Mastogloia apiculata W. S. (Smith's B. D., pl. 62, fig. 387, p. 65.) Very scarce.

This genus should be included under *Cocconeis*. It differs but slightly in the presence of marginal loculi, which are frequently quite indistinct.

Melosira ornata Grun. (Van Heurek's Syn., pl. 91, fig. 20.) Frequent.

Melosira sulcata Kg. (Van Heurek's Syn., pl. 91, fig. 18.) Frequent.

Melosira varians Ag. (Van Heurek's Syn., pl. 85, figs. 11-15.) Frequent.

Navicula abnormis Cast. (Challenger Exp., pl. 28, fig. 19, p. 27.) Frequent.

This diatom is possibly only a variety of *N. apis* Donk. as figured in Schmidt's Atlas, pl. 12, fig. 17, and pl. 69, fig. 41. I have, however, found it to be very constant in form and frequent in this gathering, thus agreeing with the experience of Conte Castracane (p. 27). The name, however, is unfortunate, as it had been bestowed on a totally different diatom by Grunow. See Cleve's (1880) *Arctischen*, pp. 46, 47. Also Cleve and Möllus Types No. 142.

Navicula Americana E., variety. (Ehrenberg's Mik., pl. 2-2, fig. 16; O'Meara I. D., pl. 30, fig. 30.) Very scarce.

Navicula aspera Ehrb. var. *intermedia* Grun. (Schmidt's Atlas, pl. 48, fig. 14.) Frequent.

Navicula bisulcata Lag. (Schmidt's Atlas, pl. 49, figs. 15, 16.) Scarce.

Navicula borealis Ehrb. (Schmidt's Atlas, pl. 45, figs. 15-21.) Scarce.

Navicula caribæa Cleve. (Schmidt's Atlas, pl. 6, figs. 10-12.) Frequent. See note under next species.

Navicula clavata Greg. (Donkin's B. D., pl. 2, fig. 8; Schmidt's Atlas, pl. 3, fig. 13.) Frequent.

This diatom, of which the typical form and three well-marked varieties are found in this gathering, is frequently confused with the preceding species *N. caribæa* of Cleve. Schmidt, after giving the correct figure for *N. caribæa* in pl. 6, figs. 10-12, applies the same name to the present species, as in pl. 2, fig. 17, and pl. 70, fig. 48. That the true *N. caribæa* is the one figured in pl. 6, figs. 10-12, is proven by the fact that Cleve refers to this figure in his "*Vega Diatoms*," p. 496.

I must add that it would be better to include *N. clavata* with all its varieties under *N. lyra* Ehrb.

Navicula cluthensis Cleve. (Cleve's (1880) "*Arctischen*," pl. 2, fig. 49.) Scarce.

Navicula distans W. S. (Schmidt's Atlas, pl. 46, fig. 12.) Common.

This diatom is identical with the figure above referred to, but that it should be given Smith's name of *N. (Pinnularia) distans* is doubtful. That author was very strict on the point of moniliform costæ, separating *Navicula* from *Pinnularia* on this one characteristic. Hence he would never have called a diatom with the evident naviculoid markings of this one "Pinnularia." Besides, his description of *P. distans* states that the apices are "acute" (p. 56), which is not the case here.

Navicula exemta A. S. (Schmidt's Atlas, pl. 69, figs. 13, 10.) Frequent.

Navicula firma Kg. var. *tumescens* Grun. (Schmidt's Atlas, pl. 49, fig. 10.) Scarce.

Navicula fusca Greg. var. *delicata* A. S. (Schmidt's Atlas, pl. 7, fig. 1.) Scarce.

Though this form is analogous to *N. smithii* Breb., it differs in being not compound punctate in its costæ, but strictly moniliform costate; also in having several rows of costæ at each end of the frustule parallel with the long diameter. Ralfs distinguishes between the above in Pritchard's Inf., p. 898.

Navicula gastrum var. *placentula* Ehrb. (Van Heurek's Syn., pl. 8, figs. 26-28; Cleve's (1880) "Arctischen," pl. 2, fig. 36; Pritchard's Infusoria, p. 900.) Scarce.

Ehrenberg's *N. gastrum* and *N. placentula* are virtually the same diatom. They are considered identical by Ralfs, yet, as *placentula* is generally figured with narrower and more tapering apices than *gastrum*, I have given both names, making the later a variety of the earlier form.

Navicula granulata Breb. (Schmidt's Atlas, pl. 6, figs. 15, 16.) Scarce.

Navicula Henedyi W. S. (Schmidt's Atlas, pl. 3, figs. 3 and 18.) Scarce.

Navicula humerosa Breb. (Van Heurek's Syn., pl. 11, fig. 20.) Frequent.

Navicula interrupta W. S. (Schmidt's Atlas, pl. 45, fig. 72; Smith's B. D., pl. 19, fig. 189.) Scarce.

Kützing has given the same name to a wholly different form. See his Bacillaria, p. 100, pl. 29, fig. 93.

Navicula irrorata Grev. (Schmidt's Atlas, pl. 2, figs. 19, 22, 23.) Very scarce.

Navicula lineata Donk. (?) (Schmidt's Atlas, pl. 69, fig. 31.) Scarce.

This diatom, which is accurately illustrated by the above figure, is not the real *N. lineata* of Donkin, as is seen by comparing the above with fig. 8 on pl. I of Donkin's "British Diatoms." It is similar to A. Schmidt's *N. digrediens*; but might perhaps receive a new name.

Navicula lyra Ehrb. (Schmidt's Atlas, pl. 2, figs. 16, 24-25, etc. Van Heurek's Syn., pl. 10, figs. 1-2.) Common.

Navicula lyra, var. *dilatata* A. S. (Schmidt's Atlas, pl. 2, fig. 26.) Scarce.

Navicula lyra, var. *elliptica* A. S. (Schmidt's Atlas, pl. 2, figs. 29-31.) Frequent.

These varieties of *N. lyra* Ehrb. are all unimportant.

Navicula major Grun. (Schmidt's Atlas, pl. 42, figs. 8-10. Van Heurek's Syn., pl. 5, fig. 3.) Scarce.

Navicula mesolepta Ehrb., var. *stauroneiformis* Greg. (Van Heurek's Syn., pl. 6, fig. 15.) Very scarce.

Navicula pennata A. S. (Schmidt's Atlas, pl. 48, figs. 41-43.) Frequent.

Navicula pratexta Ehrb. (Schmidt's Atlas, pl. 3, figs. 30-31.) Scarce.

Navicula rhomboides Ehrb. (Van Heurek's Syn., pl. 17, fig. 1.) Scarce.

The making a new genus "*Van Heureka*?" for this diatom is to be deprecated.

Navicula rostellata Kg. (Van Heurek's Syn., pl. 7, figs. 23-24.) Frequent.

This is very near some forms of *N. varians* Greg.; but the costæ do not continue "radiant from central nodule," but midway between it and the apices become strictly transverse.

Navicula Schultzzei Kain. ("Atlantic City Diatoms" in the Torrey Botanical Bulletin, pl. 89, fig. 2.) Very scarce.

This diatom, though similar to *N. maculata* Edw., is probably distinct. This conclusion is reached, not from drawings, but from a careful comparison and measurement of the original diatoms named.

Navicula serians Kg. (Van Heurck's Syn., pl. 12, fig. 7.) Scarce.

Navicula Smithii Breb. (Van Heurck's Syn., pl. 9, fig. 12; Schmidt's Atlas, pl. 7, fig. 22.) Common.

This beautiful diatom presents several unimportant varieties in this gathering.

Navicula splendida Greg. (Schmidt's Atlas, pl. 13, fig. 32.) Frequent.

Navicula subcincta A. S. (Schmidt's Atlas, pl. 13, fig. 41.) Scarce.

Navicula suborbicularis Greg. (Schmidt's Atlas, pl. 8, figs. 1-6.) Scarce.

Navicula transfuga Grun. (Cleve's "Vega," pl. 35, fig. 15, p. 511.) Scarce.

Navicula Weissflogii A. S. (Schmidt's Atlas, pl. 12, figs. 26, 32.) Very scarce.

Nitzschia amphionys Grun. (Van Heurck's Syn., pl. 56, figs. 1-6.) Frequent.

The creating a new genus, "*Hantzschia*," for this diatom is wholly unnecessary.

Nitzschia gracilis Hantzsch. (Van Heurck's Syn., pl. 68, fig. 11.) Frequent.

Nitzschia marina Grun. (Van Heurck's Syn., pl. 57, figs. 26-27.) Very common.

The variety found in this gathering differs from the type in a decidedly coarser marking, the monils being evident under a quite low power of magnification. Its apices also are more regularly tapered. It is found in an endless variety of lengths, but retains a constant width in all cases. It is probably the same as "*Synedra atlantica*" of Castracane; see *Challenger* Exp., p. 53, pl. 25, fig. 16.

Nitzschia marginulata, var. *didyma* Grun. (Van Heurck's Syn., pl. 58, fig. 14.) Scarce.

Nitzschia palea W. S. (Van Heurck's Syn., pl. 69, figs. 22c, 29, 31.) Frequent.

Nitzschia panduriformis Greg. (Van Heurck's Syn., pl. 58, figs. 1-6.) Frequent.

Nitzschia punctata Grun. (Van Heurck's Syn., pl. 57, fig. 2.) Very scarce.

This is W. Smith's "*Tryblionella punctata*." It very evidently belongs to the *Nitzschia*.

Nitzschia salinarum Grun. (Van Heurck's Syn., pl. 57, fig. 18.) Scarce.

It is doubtful if the separation of this form from Smith's *N. (Tryblionella) levidensis* is justifiable.

Nitzschia sigma W. S. (Van Heurck's Syn., pl. 65, figs. 7-8.) Frequent.

Nitzschia thermalis Grun. (Van Heurck's Syn., pl. 59, figs. 15-19.) Scarce.

Pleurosigma affine Grun. (Van Heurck's Syn., pl. 18, fig. 9.) Frequent.

Pleurosigma inflatum Shad. (Mœbius's Plates, pl. 3, fig. 9. Pritchard's Inf., p. 918.) Common.

Pleurosigma Kützingii Grun. (Van Heurck's Syn., pl. 21, fig. 14.) Frequent.

This is certainly identical with *P. gracilentum* Raben., but the suggestion in Habirshaw's Catalogue, and in Cleve's (1880) "Arctischen," that it is a variety of *P. Spencerii* Grun., is probably incorrect. Great

similarity is displayed in some figures of these two forms, as in those of Van Heurck, but an examination of the diatoms will disclose a difference too wide to admit of their bearing the same name.

Podosira compressa West. (Moebius's Plates, pl. 31, fig. 11. Pritchard's Inf., pl. 8, fig. 34, pp. 15 and 938.) Very scarce.

This genus and *Hyalodiscus* need to be united.

Podosira maculata W. S. (Smith's B. D., pl. 49, fig. 328, p. 51. Schmidt's Atlas, pl. 139, fig. 7.) Common.

Pyxilla Baltica Grun. (Van Heurck's Syn., pl. 83, figs. 1, 2.) Frequent.

Raphoneis amphicerus E. (Van Heurck's Syn., pl. 36, figs. 22-28, pl. 116, fig. 17.) Frequent.

Raphoneis amphicerus, var. *rhombica* Grun. (Van Heurck's Syn., pl. 36, figs. 20-21. Moebius's plates, pl. 4, fig. 10.) Scarce.

Grunow has placed the *R. rhombus* of Roger as a variety of *amphicerus*, from which it differs only slightly.

Raphoneis gemmifera Ehrb. (Pantoesek's Hung., pl. 12, fig. 104, etc.) Very common.

Raphoneis surirella Grun. (Van Heurck's Syn., pl. 36, figs. 26-27B.) Frequent.

Rhabdonema minutum Kg. (Van Heurck's Syn., pl. 54, fig. 21.) Frequent.

Rhizosolenia styliformis Bright. (Van Heurck's Syn., pl. 79, figs. 1-5.) Very scarce.

Schizonema vulgare Thw. (Van Heurck's Syn., pl. 17, fig. 6.) Scarce.

Were the genus *Schizonema* not a fictitious one it would be well to take this form out of it, as it has no structural unity with any other members of that genus. But *Schizonema* ought to be relegated to *Navicula*, where it belongs.

Stauroneis anceps Ehrb. (Van Heurck's Syn., pl. 4, figs. 4-8.) Scarce.

Stauroneis Phœnicenteron Ehrb., var. *gracilis* (= *S. gracilis* W. S.). (Smith's B. D., pl. 19, fig. 186. Van Heurck's Syn., pl. 4, fig. 2.) Frequent.

Stauroneis Smithii Grun. (Van Heurck's Syn., pl. 4, fig. 10.) Very scarce.

Wm. Smith figures this correctly, pl. 19, fig. 193, but incorrectly calls it "*S. linearis* E." The latter is given by Van Heurck, pl. 4, fig. 8, as a variety of *S. anceps*. Grunow has named it after the first author, giving its correct figure. It seems to be truly hyaline.

Stephanodiscus Hantzschianus Grun. (Cleve's (1880) Aretis., pl. 7, fig. 131. Van Heurck's Syn., pl. 95, fig. 10.) Very scarce.

Stephanogonia Danica Grun. (Van Heurck's Syn., pl. 83 bis., figs. 7-8.) Scarce.

The form here found is a variety of the above, its ridged lines, radiating from the central apex, being more numerous and less plainly visible.

Stephanopyxis corona Ehrb. (Schmidt's Atlas, pl. 123, figs. 10-17.) Scarce.

Stephanopyxis turris Rafs. (Van Heurck's Syn., pl. 83 ter., fig. 12; Schmidt's Atlas, pl. 130, figs. 42-43; Pritchard's Inf., pl. 5, fig. 74, and p. 826.) Frequent.

Suirella minuta Breb. (Van Heurck's Syn., pl. 73, figs. 9-10.) Frequent.

Suirella ovalis Breb. (Van Heurck's Syn., pl. 73, figs. 2-4.) Common.

Suirella recedens A. S. (Schmidt's Atlas, pl. 19, figs. 2-4, pl. 24, fig. 28.) Scarce.

Suirella tenera Greg. (Schmidt's Atlas, pl. 23, figs. 7, 9.) Scarce.

Syndendrium diadema E. (Moebius's Plates, pl. 8, figs. 49-52.) Frequent.

Synedra delicatissima W. S., var. *mesoleia* Grun. (Van Heurck's Syn., pl. 39, fig. 6.) Scarce.

Synedra pulchella Kg. (Van Heurck's Syn., pl. 41, figs. 1-8.) Frequent.

Synedra ulna Ehrb. (Van Heurck's Syn., pl. 38, fig. 7.) Scarce.

Synedra ulna, var. *subæqualis* Grun. (Van Heurck's Syn., pl. 38, fig. 13.) Scarce.

This, put as a doubtful species by Van Heurck, is, as he suggests, only a variety of *ulna*.

Synedra ulna, var. *spathulifera* Grun. (Van Heurck's Syn., pl. 38, fig. 4.) Scarce.

The same is true in this case also.

Tabellaria fenestrata Kg. (Smith's B. D., pl. 43, fig. 317, p. 46.) Common.

Triceratium acutum Ehrb. (Van Heurck's Syn., pl. 108, fig. 1.) Scarce.

This genus, made up principally of triangular and quadrangular forms of *Biddulphia*, is so heterogeneous in character that it should be abandoned, as Prof. H. L. Smith suggests, and its forms assigned to their proper scientific genera.

Triceratium alternans Ehrb. (Schmidt's Atlas, pl. 78, figs. 9-17.) Very common.

Triceratium bicornis Cleve. (Schmidt's Atlas, pl. 78, figs. 24-25; Cleve's W. India Diat. pl. 5, fig. 30, p. 17.) Very scarce.

This diatom is an evident *Biddulphia*, as was suspected by Cleve when he named it. In general appearance it is much like the abnormal *B. reticulata* figured in Schmidt's Atlas, pl. 78, fig. 21; but under high magnification it fails to show the reticulating secondary markings characteristic of that species.

Triceratium cinnamomeum Grev. (Moebius's Plates, pl. 47, fig. 12; Schmidt's Atlas, pl. 151, figs. 23-27; Van Heurck's Syn., pl. 126, fig. 1.) Very scarce.

The specific name is variously spelled *cinnamomeum*, *cinnamoneum*, and as above. Van Heurck includes it in *Cestodiscus*, to which it presents doubtful analogies.

Triceratium inelegans Grev. (Moebius's Plates, pl. 71, fig. 21; Van Heurck's Syn., pl. 110, figs. 2-5.) Common.

See note under *T. punctatum*.

Triceratium ornatum Shad. (Moebius's Plates, pl. 16, figs. 10-14; Schmidt's Atlas, pl. 98, figs. 7-13.) Scarce.

This is Wallisch's *Amphitetras pentacrinus*, and is essentially the same as *T. biquadratum* Janisch, *T. junctum* A. S., *T. Balearicum* Cleve, and a large number of unimportant varieties, as "var. *hirsuta*," in Challenger Exp., pl. 23, fig. 9. This diatom is remarkably variable, even in a single gathering, which is probably the reason for the number of pseudonyms created for it. The name "*pentacrinus*" is deceptive.

Triceratium punctatum Bright. (Moebius's Plates, pl. 9, fig. 18. Van Heurck's Syn., pl. 109, figs. 6, 9-10.) Very common.

The strict types of both this and *T. inelegans*, Grev. are found in this gathering and many intermediate forms, which make it evident that these two close species are merely varieties of one. Though the name "*inelegans*" is not well chosen for these forms, it should be preferred to "*punctatum*," as Wallisch has applied the latter to a wholly different diatom. See Moebius's Plates, 31, fig. 21.

Triceratium Weissii, Grun. (Schmidt's Atlas, pl. 95, figs. 2-12.) Scarce.

Trinacria excavata Heib. Forma tetragona. (Schmidt's Atlas, pl. 152, figs. 26-28.) Scarce.

The necessity noted under *Triceratium* for doing away with the genus also exists in this case. *Trinacria* should be united with *Solium* and *Hemiaulus* and be given either the last name, as the oldest (1840 by Ehrenberg), or *Solium*, as the most suggestive.

A number of sports and abnormalities of some of the species named were found in this gathering, but have not been described, as they have no bearing on classification.

NEWARK, N. J., March, 1892.